Interdisciplinary Collaboration: Essential for Improved Wound Care Outcomes and Pressure Injury Prevention in the ECMO Thoracic Surgery Patient Population

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Background

ECMO patients both VA and VV cannulation are among the most critically ill patient populations and like many ICU patients are at high risk for hospital-acquired pressure injuries (HAPIs). Although general risk factors for ECMO patients include age, immobility, poor nutritional status, as well as other comorbidities, thoracic surgery patients receiving ECMO are at a higher risk due to cardiopulmonary bypass time, vasopressor therapy, and body temperature in the operating room (1). HAPIs are often seen in the ICU setting with ECMO patients, costing anywhere between $500 to $70,000 per pressure injury (1).

Skin care goals for patients receiving ECMO support should be largely similar to any patient that is in the intensive care setting. Due to the extensive preventative skin care needed for this patient population, this quality improvement project was initiated following a rise in reportable HAPIs across the Thoracic Surgery patient population.

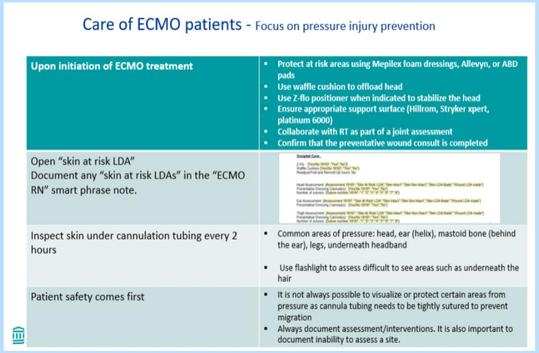
Although alternative measures have been explored and implemented based on the Braden score of the patient, including the use of specialty beds, turning and repositioning of a patient, and use of specialized offloading heel boots, this patient population remains among the highest for at risk skin/pressure injuries (2). Following a rise in HAPI reports on the ECMO patient population in the Thoracic ICU, a gap analysis was performed, and barriers were identified. In a collaborative approach, nursing, nursing leadership, respiratory therapy and wound ostomy continence specialists identified wound staging, ease of accessibility to wound care recommendations, and communication as barriers to providing proper preventative wound care to the ECMO patient population.

Purpose

The Thoracic Surgery leadership team along with the unit-based skin champions and the wound care nurses worked together to establish "Care of the ECMO patients" with a focus on pressure injury prevention. The goals of this quality improvement project are to increase unit compliance to wound care treatment recommendations, promote effective communication between the WOC Nursing team and the nursing staff, and provide nurses with the appropriate tools to better address the skin care needs of this patient population and to improve their quality of care.

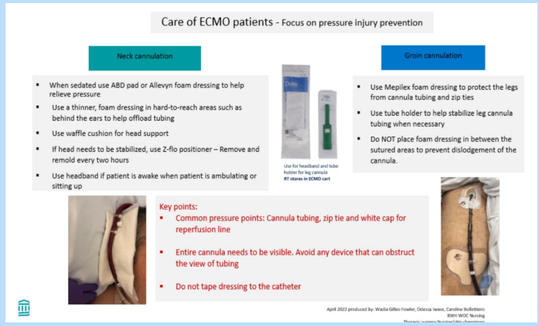
Measures

Education was provided to the staff focusing on preventative measures for pressure injury formation and increasing compliance with wound care treatment recommendations within the ECMO population. This was performed through weekly rounding by the WOC RNs, collaborative education with the Nursing leadership, and the presence of the skin champions on the unit to help reinforce wound care education. An ECMO skin preventative tip sheet was created in partnership with the wound care RNs, respiratory therapists, unit-based skin champions and the nursing leadership team of the thoracic unit. The ECMO bundle was put together to include wound care consult upon ECMO initiation and a skin care checklist that needs to be completed by the bedside RN within four hours of ECMO cannulation. Lastly, an ECMO smart phrase note was created to facilitate thorough documentation by the bedside nurses.



Care of ECMO patients - Focus on pressure injury prevention

Upon initiation of ECMO treatment	• Protect at risk areas using Mepilex foam dressings, Allevyn, or ABD pads • Use waffle cushion to offload head • Use Z-flo positioner when indicated to stabilize the head • Ensure appropriate support surface (Hillrom, Stryker xpert, platinum 6000) • Collaborate with RT as part of a joint assessment • Confirm that the preventative wound consult is completed
Open "skin at risk LDA" Document any "skin at risk LDAs" in the "ECMO RN" smart phrase note.	
Inspect skin under cannulation tubing every 2 hours	• Common areas of pressure: head, ear (helix), mastoid bone (behind the ear), legs, underneath headband • Use flashlight to assess difficult to see areas such as underneath the hair
Patient safety comes first	• It is not always possible to visualize or protect certain areas from pressure as cannula tubing needs to be tightly sutured to prevent migration • Always document assessment/interventions. It is also important to document inability to assess a site.



Care of ECMO patients - Focus on pressure injury prevention

Neck cannulation

- When sedated use ABD pad or Allevyn foam dressing to help relieve pressure
- Use a thinner, foam dressing in hard-to-reach areas such as behind the ears to help offload tubing
- Use waffle cushion for head support
- If head needs to be stabilized, use Z-flo positioner – Remove and remold every two hours
- Use headband if patient is awake when patient is ambulating or sitting up

Use for headband and tube holder for leg cannula
RT stores in ECMO cart

Groin cannulation

- Use Mepilex foam dressing to protect the legs from cannula tubing and zip ties
- Use tube holder to help stabilize leg cannula tubing when necessary
- Do NOT place foam dressing in between the sutured areas to prevent dislodgement of the cannula.

Key points:

- Common pressure points: Cannula tubing, zip tie and white cap for reperfusion line
- Entire cannula needs to be visible. Avoid any device that can obstruct the view of tubing
- Do not tape dressing to the catheter

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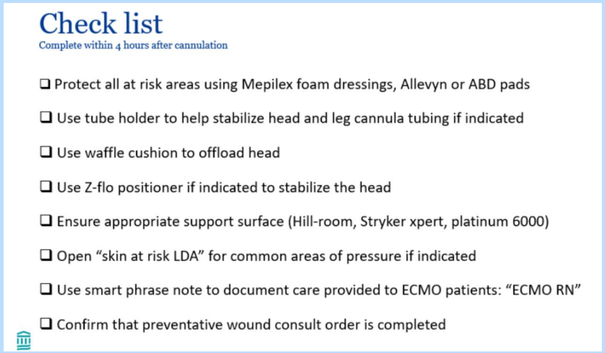
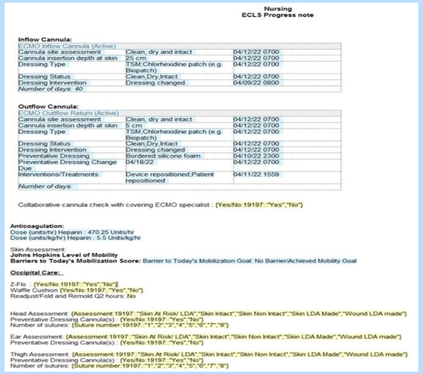


Check list

Complete within 4 hours after cannulation

- ❑ Protect all at risk areas using Mepilex foam dressings, Allevyn or ABD pads
- ❑ Use tube holder to help stabilize head and leg cannula tubing if indicated
- ❑ Use waffle cushion to offload head
- ❑ Use Z-flo positioner if indicated to stabilize the head
- ❑ Ensure appropriate support surface (Hill-room, Stryker xpert, platinum 6000)
- ❑ Open "skin at risk LDA" for common areas of pressure if indicated
- ❑ Use smart phrase note to document care provided to ECMO patients: "ECMO RN"
- ❑ Confirm that preventative wound consult order is completed



Nursing
ECLS Progress note

Inflow Cannula:

ECMO Inflow Cannula (Active)		
Cannula site assessment	Clean, dry and intact	04/12/22 0700
Cannula insertion depth at skin	25 cm	04/12/22 0700
Dressing Type	TSM,Chlorhexidine patch (e.g. Biopatch)	04/12/22 0700
Dressing Status	Clean,Dry,Intact	04/12/22 0700
Dressing Intervention	Dressing changed	04/09/22 0800
Number of days: 40		

Outflow Cannula:

ECMO Outflow Return (Active)		
Cannula site assessment	Clean, dry and intact	04/12/22 0700
Cannula insertion depth at skin	25 cm	04/12/22 0700
Dressing Type	TSM,Chlorhexidine patch (e.g. Biopatch)	04/12/22 0700
Dressing Status	Clean,Dry,Intact	04/12/22 0700
Dressing Intervention	Dressing changed	04/12/22 0700
Preventative Dressing	Bordered silicone foam	04/10/22 2300
Preventative Dressing Change Due	04/18/22	04/12/22 0700
Interventions/Treatments	Device repositioned,Patient repositioned	04/11/22 1559
Number of days:		

Collaborative cannula check with covering ECMO specialist : {Yes|No:19197:,"Yes","No"}

Anticoagulation:
Dose (units/hr) Heparin : 470.25 Units/hr
Dose (units/kg/hr) Heparin : 5.5 Units/kg/hr

Skin Assessment:
Johns Hopkins Level of Mobility
Barriers to Today's Mobilization Score: Barrier to Today's Mobilization Goal: No Barrier/Achieved Mobility Goal

Occipital Care...

Z-Flo : {Yes|No:19197:,"Yes","No"}
Waffle Cushion:{Yes|No:19197:,"Yes","No"}
Readjust/Fold and Remold Q2 hours: No

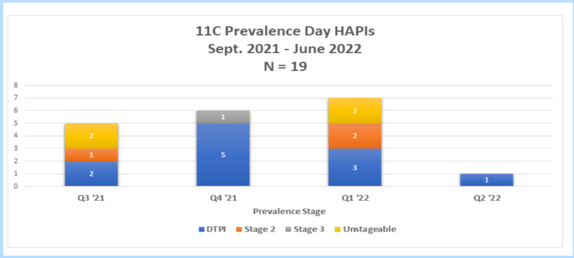
Head Assessment :{Assessment:19197:,"Skin At Risk/ LDA","Skin Intact","Skin Non Intact","Skin LDA Made","Wound LDA made"}
Preventative Dressing Cannula(s) : {Yes|No:19197:,"Yes","No"}
Number of sutures: {Suture number:19197:,"1","2","3","4","5","6","7","8"}

Ear Assessment :{Assessment:19197:,"Skin At Risk/ LDA","Skin Intact","Skin Non Intact","Skin LDA Made","Wound LDA made"}
Preventative Dressing Cannula(s) : {Yes|No:19197:,"Yes","No"}

Thigh Assessment :{Assessment:19197:,"Skin At Risk/ LDA","Skin Intact","Skin Non Intact","Skin LDA Made","Wound LDA made"}
Preventative Dressing Cannula(s) : {Yes|No:19197:,"Yes","No"}
Number of sutures: {Suture number:19197:,"1","2","3","4","5","6","7","8"}

Outcomes

Prevalence data collected for September 2021 (Q3) and December 2021 (Q4) show 5 to 6 Hospital-Acquired Pressure Injuries (HAPIs) within the thoracic unit. Despite the different wound care interventions there continues to be an increase in the number of HAPIs within the ECMO patients' populations as reflected in March 2022 (Q1) prevalence data showing an increase of about 16.67%.
In March 2022 the new ECMO bundle was piloted on the unit. Following the implementation of the ECMO pressure injury prevention bundle, an overall reduction in the number of HAPI was noted to be 85.71%. These findings support the positive result of the new ECMO bundle contributing to a decrease in the number of pressure injuries and improvement in wound care compliance.



Conclusion

The ECMO bundle was created to promote early prevention of pressure injuries and to help with wound care compliance in the thoracic surgery and ECMO patient populations. The ECMO tip sheet highlights the areas at highest risk for pressure injuries such as the occiput, mastoid bone, coccyx and thighs. Best practice is to evaluate the skin and implement the interventions on the checklist within four hours of cannulation. The bundle also provides the best practice for ongoing pressure injury prevention and engagement of the WOC nurses before pressure injuries occur. Documentation has also improved with the creation of the ECMO RN smart phrase. The bundle has overall led to a decrease in pressure injuries in this fragile population. Additionally, by utilizing an interdisciplinary approach, nurses reported increased empowerment due to improved communication leading to improved patient care, advocacy, and knowledge.

References

1. Firstenberg, M. (2019). Advances in extracorporeal membrane oxygenation - volume 3. https://doi.org/10.5772/intechopen.77697
2. Courtwright, S. E., Mastro, K. A., Preuster, C., Dardashti, N., McGill, S., Madelon, M., & Johnson, D. (2017). Reducing hospital-acquired pressure ulcers using bundle methodology in pediatric and neonatal patients receiving Extracorporeal Membrane Oxygenation therapy: An integrative review and call to action. Journal for Specialists in Pediatric Nursing, 22(4). https://doi.org/10.1111/jspn.12188